necessity of its constitutional origin, for otherwise the return of a tumor would not depend upon the repullulation of the tissue and the transportation of the morbific agent, etc., which is opposed by our other experience. With regard to the heredity of cancer, it is well known that not alone constitutional conditions, but even the color of the skin, the condition of the hairs, nails, etc., may also be inherited. On the other hand, the local origin of the disease is testified to by the fact that it usually develops singly, or, if multiple, in one organ or anatomical system, that its development is often attributable to local irritative conditions, and that all sorts of hypertrophic tissues and tumors of a strictly local nature—such as cicatrices, warts, adenomata, fibromata, etc.—may be converted into cancer.

A review of the reasons adduced pro and con., will lead us to decide in favor of the local origin of cancer. The further question now is, under what conditions does it develop?

For some time it was believed that nervous influence played a certain part in the development of cancer, but this view is destitute of foundation.

Nor do we look with favor upon the view that cancer is due to the entrance of an agent from the outside, whether in the form of a contagion, miasm, or any other specific infectious matter. For it is opposed to all experience that a ferment-like increasing substance should require years in order to develop at the point of entrance into an amount appreciable to the senses, that being deposited there it does not become diffuse until certain local conditions have been fulfilled, and that its product, carried into another organism, is not as certain in its effects as the original matter. Numerous negative results have been obtained in inoculation experiments, and but three successful ones have been reported. O. Weber found that a quantity of encephaloid cancerous tissue, introduced under the skin of a dog and a cat, gave rise to a similar proliferation at the point of introduction. Gujon made two successful experiments. In a white rat, in which particles of cancer were introduced under the skin, a carcinoma as large as an almond developed upon the inside of the sternum, the death of the animal taking place two months after the experiment. A guinea pig showed a cancerous nodule at the site of inoculation, twenty-five days after the experiment. But the occurrence of the new growths may be explained by the continuous proliferation of the elements introduced with the mass of tissue or a proliferation per contiguum.

Another hypothesis consists in the assumption that all kinds of mechanical, thermal, chemical, and other irritants, if active for a long time, may produce cancer. Thus, mammary carcinoma is attributed to the injuries received during lactation; cancer of the lip to the action of the mouth end of the article used in smoking, or to the irritating substances contained in tobacco. Pott, Earl Sr., and Desault noticed during the last century that cancer of the scrotum, which occurs almost exclusively in chimney sweeps, is observed only in those who have continued uninterruptedly at the trade for a long time. Recently J. Bell, Manouvriez, and Tillmans have reported cases of cancer of the testis as a result of the action of paraffin vapors and in these patients tar acne eruptions were also present.

If we add that all kinds of chronic ulcers may degenerate into carcinoma, that not alone epithelioidal tumors, but also those of decided histioidal character, may be changed into carcinoma under the influence of persistent traumatism, and finally that the effective irritants are demonstrable even in carcinoma of the internal organs—we possess such an abundance of data for the mechanical, irritative origin of cancer, that it will not appear

altogether astonishing if some regard carcinoma simply as an inflammatory product or co-ordinate with it.

In addition to all these clinical arguments, the histological results materially aid this theory. It is well known that the immediate neighborhood of the growth presents a vascularization and small-celled infiltration of the tissues like that of the inflammatory process, and that these conditions sometimes assume the upper hand to such an extent that the cancerous elements are almost entirely concealed. Waldeyer even goes so far as to raise the question whether chronic inflammatory processes of a local character cannot finally be converted into carcinomatous degeneration.

If this view did not presuppose some lesion or local irritative condition, the absence of the latter in cases of cancer would be less striking. But we will very often convince ourselves that no local factor can be discovered. Cancer of the lower lip will serve as an illustration. As we have seen, this is regarded as the result of continued injury in smoking, either from the mouth-piece of the pipe or the irritation of tobacco juice, or perhaps from the injury received while shaving. But it is notorious that this form of cancer may develop also in women, who are not subject to such traumata. Thus, among 145 cases collected by C. Koch, 13 were females; in 15 cases alone, i. e., 10.35%, did he find a local cause.

This also holds good with regard to other localizations of cancer, and the material collected by the "Congress of German Surgeons" showed that traumata acted as a cause of cancer in only 8 to 16% of the cases.

We must here state that those pathologists who favored the view of a local, inflammatory irritant origin of cancer were aware of the fact that such a cause was not always demonstrable, but assumed that it might be present in another form. Therefore, Virchow, starting from the experience that neoplasms and particularly carcinoma often developed upon a cicatricial, lupoid ulcerated base, enlarged this view into the doctrine that since carcinoma is a purely local disease, it must have a local cause, and this implies that, when such a cause is not demonstrable, a specific, local condition of weakness exists, which leads to the development of the new growth.

Cohnheim has recently advocated the theory that the cause of all tumors must be sought in an irregularity of the embryonal germ. He believes that in a very early stage, perhaps in the developmental period between the complete differentiation of the germinal layers and the complete development of the germs of the individual organs, more cells are produced than are necessary for the organ, so that a number of cells remain unused, but these, though perhaps small in number, possess great power of proliferation on account of their embryonal nature. If this redundant mass of cells is accumulated in one spot, it forms the local germ.

Although no positive proof of this theory can be offered, it is undeniable that a number of circumstances testify in its favor. Thus, it serves to explain congenital cancers. It is also supported by the fact that carcinoma develops preferably in those parts of the body in which, at an early stage of embryonal development, involutions of the external germinal layer occur and therefore irregularities could take place so much more readily.

According to Cohnheim, the outbreak of the neoplasm requires no other conditions than the supply of blood furnished by the normal circulation. This author also believes that traumata, on account of the inflammatory hyperæmia or the weakness produced in the parts around the germinal nidus, may give rise to increased activity and thus aid the development of carcinoma. But the traumata merely act then as exciting causes.

Finally, Cohnheim comes to the conclusion that all the peculiarities of tumors may be explained in a satisfactory manner by this theory.

I have no doubt that of all the theories hitherto considered none will give a more plausible explanation of a larger number of conditions associated with neoplasms, but another series of conditions have not been regarded by Cohnheim and for these he has offered no explanation whatever.

In the first place he does not explain what occurs to the epithelial neoplastic germ in order that, at the end of fifty years perhaps, it may be converted into a carcinoma. Nor does he explain how a cancer develops finally from a harmless ulcer, an adenoma, fibroma, etc., which has already used up its neoplastic germ.

From the preceding historico-critical consideration of the theories of the etiology of cancer, we must reach the conviction that none of them is entirely satisfactory. My own belief, like that of the majority of clinicians, is that every form of neoplasm requires a specific, predisposed base, in order that traumata and irritants of all kinds, disturbed functions of organs or systems, age, etc., may produce them.

Among the more immediate causes of cancer of the skin we will enumerate :

1. *Heredity.*—This is manifested in two ways. Either the cancer is present at birth or it develops in after-life. The former was long disputed, but Friederich reports a case in which a woman suffering from cancer gave birth to a fœtus with a cancerous nodule in the cutis and subcutaneous cellular tissue above the left patella. Broca found that in one large family sixteen deaths from cancer occurred in the course of seventy years. Sibley gives the proportion of inherited cases as 1 : 10, Lebert as 1 : 12, Velpeau 1 : 8, and Cocke (Report of the London Cancer Hospital) 1 : 7. Experience also teaches that cancer, when it recurs in a family, attacks preferably the same organ or system.

2. *Age.*—Among all the various neoplasms, none is so intimately connected with the retrogressive period of the human organism as carcinoma. This fact has led not infrequently to the exaggerated notion that all malignant tumors of advanced age are carcinomatous. Tanchu found that among 9,118 deaths from cancer, there died

Before the 20th year, 49 individuals.
From 21– 30 years, 231 individuals or 3.1%.
" 31– 40 " 1,012 " 11.1%.
" 41– 50 " 1,975 " 21.7%.
" 51– 60 " 2,108 " 23.2%.
" 61– 70 " 1,067 " 32.7%.
" 71– 80 " 1,315 " 14.4%.
" 81–100 " 361 " 3.9%.

The majority of deaths, viz., 67.55%, occur, therefore, from the age of 41 to 70 years. Other statistical tables have not given entirely similar results, for the reason that they included different kinds of cancer.

Gurlt has collected statistics of 11,131 cases of cancer observed in three Vienna hospitals, including 948 cases of cancer of the skin. These occurred, with regard to age, as follows :

From 0–20 years, 12 cases, i. e., 1.26%.
" 21–30 " 19 " " 2.00%.
" 31–40 " 96 " " 10.13%.
" 41–50 " 195 " " 20.75%.

From 51–60 years, 292 cases, i. e., 31.06%.
" 61–70 " 237 " " 25.21%.
" 71–80 " 78 " " 8.30%.
" 81–89 " 19 " " 2.00%.

948

These results differ to a certain extent from those furnished by other statistics, inasmuch as the average age for cancer is usually at 48.5 years, while that of cancer of the skin alone is about one decade later (55 to 60 years). The essential reason of the occurrence of cancer at an advanced age is still unknown.

3. *Sex.*—The statistics of hospitals usually show a preponderance of the female sex, on account of the frequency of mammary and uterine cancer. In Gurlt's tables, cancer occurred 2,946 times in men, 7,479 times in women, and in 706 cases no sex was mentioned.

But among the 948 cases of cancer of the skin, 739 were males and 209 females. This proportion also is supported by anatomical data, inasmuch as the structure of the male skin, with its more fully developed glandular apparatus, seems to be more predisposed to aid the development of cancer.

4. *Traumatism ; mechanical, chemical, inflammatory, specific, and other local irritations.*—We will here reiterate that we are far from regarding local irritants as the sole cause of the production of cancer, though we are not disposed to deny their influence altogether. Their effect is dependent upon the specific predisposition of the skin. When this is present, the carcinoma may develop, after the action of the irritant, upon a previously normal structure, and also in the vicinity of a compression atrophy, in a tissue infiltrated with simple, atypical epithelial proliferation (Friedlander) in a tissue-system presenting phenomena of inflammation or proliferation. The recognition of the latter possibility possesses great diagnostic and prognostic significance, so that we should not be unprepared to find a cancer developing in an ulcerative process, a degenerating adenoma (Verneuil), after caries, etc., even in youthful individuals. Nor will we be surprised that cancer develops preferably in places in which there are permanent disturbances in the anatomical constitution of the tissues. Every physician probably has observed that the dirty gray, so-called sebum warts situated on the temples, forehead, nose or back, the nævus spilus and verrucosus, etc., which are often present since early childhood, gradually become hypertrophied and fissured in later life, ulcerate, and finally become cancerous.

In like manner it is in conformity with the above assumption that cancer sometimes develops in a spontaneous or protopathic cicatrix. But not all tumors of this kind should be regarded as cancerous until they have been examined microscopically and carefully observed clinically. In such cases the origin of the cicatrix should always be determined.

With regard to ordinary lupus the majority of physicians entertain no doubt that carcinoma may develop from it and even from the true lupus tissue itself. The explanation of this circumstance is found in the fact that the irritative condition, which lasts for years, may finally transform the granulation cells of lupus into those of carcinoma.

This leads us involuntarily to the consideration of the question raised by Virchow as to the combination and transition into one another of morbid growths in general. I must answer this question unhesitatingly in the affirmative. For, on the one hand, it has been shown that histioid, organoid, or teratoid tumors, for example, adenoma of the

axilla, which develops particularly in women, sarcoma, enchondroma, fibroma molluscum, dermoid cysts (of the neck), etc., may be associated with carcinoma; and, on the other hand, it has also been demonstrated that the cancerous elements may develop from all types of elements and tissues through the medium of the indifferent formative cells.

5. For some time certain constitutional diseases, such as syphilis, scrofula, tuberculosis, etc., have been regarded as causes of carcinoma. We are not prepared, however, to recognize a direct causal relation between these processes and carcinoma, though they may aid its outbreak and rapid propagation.

6. Nor do we believe that obesity, continuous health, or too nutritive food can be regarded as causes of carcinoma. The proofs of such a relation are entirely wanting.

7. *Telluric and climatic conditions.*—English writers have maintained that cancer sometimes develops more frequently in healthy localities, sometimes in marshy regions, and they have concluded that the character of the soil is an exciting cause. I consider this opinion, also, as entirely unproven.

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Hitherto we have investigated only the causes of primary cancer, and it now remains to explain the mode of development of the secondary process, of the metastatic infiltrations and nodules. Unfortunately, however, there is no agreement of opinion on this point.
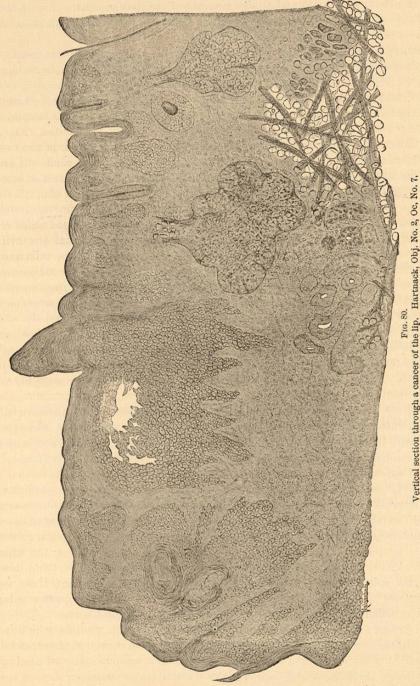
The theory of infection was based originally on humoral pathology and assumes, at the present time, that the juices or a substance dissolved in them, or certain corpuscular elements possess in a form of virus the infectious property of producing a secondary process, in the locality to which they are carried.

Gussenbauer assumes that the smallest elements derived from the primary growth are taken up in the protoplasm or nuclei of the cells and thus constitute the first stage of infection. The theory of infection is supported by the occurrence of general carcinosis, the appearance of cancerous nodules outside of the vascular domain of the primary nodule, and their frequent absence in places in which they would naturally be expected. But the theory is opposed by insurmountable objections, such as the complete immunity of cartilage from metastases. The entire symptomatology of the secondary affection also opposes this theory, as is shown by comparing it, for example, with the history of syphilis.

The theory of transplantation is also unable to answer all possible questions, but it nevertheless explains the symptoms in a more satisfactory manner. It explains more readily the fact that the lymphatic glands in the vicinity are first affected, that cellular elements like those in the primary nodule are found not alone in recent thrombi within the vessels, but also in remote parts at the ends of the capillaries (capillary emboli) though no trace of cancer can be found in the surrounding tissues. But the exclusive development of metastases from proliferation of wandering cancer elements does not readily explain their rapid formation; this is easily explained, however, if we assume that the transplanted elements possess the power of causing a proliferation of similar elements in the various tissues.

Anatomy.—Cancer of the skin occurs either in the form of nodules, which is rare, or of nodular infiltration. It varies from the size of a pea to that of a walnut or more, is usually of cartilaginous hardness; in the beginning it has a pale rose-red, and later a grayish red, dark red or grayish white appearance, and is traversed by dilated vessels. The surface is even, nodulated, or papillary. In recent cancers of the skin the cut section is pale red, moist and granular; in older ones it is white or grayish white, dry,

fibrous or coarsely granular. The knife passed over it removes a small quantity of a thickish, pulpy, white or yellowish white mass. Lateral pressure causes the appearance

Fig. 80. Vertical section through a cancer of the lip. Hartnack, Obj. No. 2, Oc, No. 7.

of rounded, elongated, cylindrical depressions or, more properly speaking, in part sausage-shaped plugs, in part whitish or reddish white masses, which are loosened by a serous

or sero-sanguinolent, scanty fluid. Upon the addition of a 0.5 per cent solution of salt, the microscope reveals in these masses a granular, molecular detritus with a few cholesterin crystals here and there, and a large number of epithelioid cells. The isolated cells almost always present the pavement epithelium type; the nuclei and nucleoli are often increased and occasionally cell fission is noticed.

Microscopical examination of the growth should begin at the adjacent healthy tissue. The first deviation noticeable is that the cones of the rete Malpighii gradually become larger (Fig. 80). *a.* Upon close inspection it is found that their peripheral epithelium cells have become cylindrical and are followed toward the centre by larger cubic and rhombic cells or flat, compressed, many-angled cells, etc., provided with spines and dentations. Many of them have one or more distinct nuclei, nucleoli, and occasionally vacuoles. The papillæ and the tissue of the cutis have suffered no noteworthy change. Towards the centre the changes increase. The sprouts of epithelium become larger and send off branches. In the more developed parts, accordingly, are found large, flattened masses of epithelium with branches extending into the corium. *b.* Here and there a sprout of epithelium has spread so far into the connective tissue that, as a result of the inflammatory proliferation in the adjacent parts, it has been separated and converted into a brood nest for one or more cancer colonies. *c.* Careful examination of such places shows that the cylindrical form of the cells is either rudimentary or not visible, but a division of the cells and nuclei is often noticed; the concentrically laminated spheres of epidermis are rarely met with. An irritative condition, followed by proliferation, has been established in the papillæ and corium, corresponding to the changes in the epithelial parts of the cancer. *d.* The result is that sometimes the swollen and infiltrated papillæ project beyond the surface of the skin and divide dichotomously, giving rise to the appearance of carcinoma papillare. Or the irritation, which goes hand in hand with the epithelial proliferation, acts uniformly upon the corium, and then this is infiltrated throughout with round cells; the connective tissue corpuscles are more numerous, the vessels dilated, and the elements of their walls in a condition of proliferation.

There may be all possible transitions from the above-described simplest form to that variety which takes its origin either from the deeper layers of the corium, the subcutaneous connective tissue, or from the glands of the cutis, and which spreads into the muscular tissue as far as the bones. Macroscopically this variety often forms large nodules, of a rosy to dark red appearance, which are usually moist or juicy on cut section.

Under the microscope the beginning of the pathological change is manifested by a scanty round-cell proliferation in the connective tissue, so that a gradual increase of cells is observed in all the epithelioidal parts (interpapillary rete, sebaceous glands, root sheaths, and sweat glands). The histological changes become more striking as we approach the neoplasm. The epithelial cones are more enlarged than in the superficial variety of cancer, and present numerous dendritic ramifications. If the process has started in the epithelioidal structures of the skin (glandular carcinoma), these undergo such changes as to become unrecognizable; the membrana propria is perforated by the proliferation which spreads in all directions into the neighboring tissues. The connective tissue stroma sometimes disappears almost entirely from the pressure of the proliferated epithelium, sometimes in consequence of the irritation it is infiltrated with round cells; in addition the connective tissue corpuscles present various stages of proliferation, the blood-vessels are dilated, and their walls in a condition of irritation.

The most distinct appearances are visible in the cancerous focus itself. Here the proliferation of the epithelium predominates to such an extent that nothing is seen

but the proliferated epithelium alternating with connective tissue in various stages of irritation. The former usually assume a rounded form, but in addition there are some cancer bodies composed of irregularly grouped cells, others which present dendritic ramifications, and still others which assume polygonal, elongated shapes, or pass into irregular streaks.

One of the most frequent variations of form resulting from the mutual relations of the cancer nests to the stroma, develops when the former, while continuing to proliferate, become isolated and situated in the interspaces (alveoli) of the latter. But this isolation is not absolute, inasmuch as the concentric globes often maintain their connection with one another over a wide extent, and in this way the connective tissue forms an interlacing network.

The alveolar structure has been regarded as a special diagnostic feature of this neoplasm, but it is also found in other forms of tumor (adenoma, sarcoma alveolare, etc.).

Not alone does the connective tissue constitute a supporting frame-work for the cancer cells and bodies, but by its blood-vessels and lymphatics it also supplies their nutrition, and thus exercises an often decisive influence upon the progress of the tumor. Newly formed vessels are always found at the site of maximum development of the cancer. Very vascular cancers of the skin run a more rapid course and are less amenable to treatment.

To complete the previous details, we must mention that deep cancer of the skin may spread to all the tissues underneath the subcutaneous connective tissue, thus giving rise in part to a cancerous metamorphosis of these tissues, in part to hypertrophy or atrophy of them. The cancerous bodies press forward into the interstitial spaces, causing an embryonal cell proliferation in the stroma, which then changes into cancerous tissue, or the pressure and irritation cause hypertrophy or atrophy of the neighboring tissues, so that the adipose cells, muscular substance, nerve fibres, etc., are finally destroyed by fatty, granular degeneration. As a result, the bones of the skull, jaw, shins, etc., may be perforated and destroyed.

Hitherto we have considered the anatomical structure of cancer of the skin in general, but more detailed investigation shows that it presents a considerable variety of conditions. In the variety known as carcinoma simplex, the mass of cancer cells is approximately equal to that of the stroma. In carcinoma medullare, the epithelioid cells predominate over the stroma; sometimes the stroma is reduced to a minimum or has entirely disappeared in places. Waldeyer also described an adenoid variety of cancer, which consists of tubuli-like "concentric bodies" imbedded in alveoli which are infiltrated with small cells. This may be mistaken for sweat gland cancer, but the tubuli of the latter are always narrower and convoluted, and the external cells more cuboidal.

In atrophic, cicatricial cancer of the skin (carcinoma atrophicum), the stroma may attain such dimensions, if spontaneous recovery occurs, that the "concentric bodies" disappear entirely or almost entirely, and the entire new-growth is composed of dense, firm, shining connective tissue with some elastic fibres. This variety has long been known as scirrhus.

The usual appearance of the stroma may also be changed by the exceptional increase of its cellular elements. If this excessive proliferation affects the round cells, it gives rise to a carcinoma granulosum; when many spindle cells are present, to a carcinoma sarcomatosum. When pigment granules are present in large amount in the various cells and intercellular substance of the cancer, it is known as carcinoma melanoticum. This

form is rare and its diagnosis must be made cautiously on account of the relatively greater frequency of sarcoma melanodes.

The number of vessels in the stroma may also vary greatly ; in rare cases, they are almost entirely absent, and in soft cancers the new-formed vessels may constitute the major portion of the stroma.

Other variations in the character of the growth may be the result of retrogressive changes. One of the most common is the cornification of the cancer cells, which sometimes involves whole alveoli (carcinoma keratoides). The epithelium becomes laminated like the layers of an onion (pearl globules, epidermic globules). Carcinomata in which this process is far advanced, feel hard and dry, and the cut section presents a white, shining, homogeneous appearance or a delicately streaked, fibrous surface.

Fatty degeneration is found in almost all old cases of cancer of the skin, either associated with the change just mentioned or existing separately. It is always circumscribed, confined either to a few cells or to one or more foci. If this degeneration takes place in a cancerous nodule situated upon parts which are predisposed to the development of certain tumors, for example, upon the scalp, it may be difficult to decide whether the starting point is a primary cancer, a cyst, etc.

Mucoid softening, ossification, and partial or total calcification constitute rare degenerations of cancer.

Suppuration and ulcerative destruction of cancer of the skin will be discussed under the caption of "course and termination" of the disease.

Histogenesis.—In 1855 Virchow, after having shown that a number of tumors were formed from the connective tissue corpuscles, enunciated the theory that the epidermoidal elements of cancroid could also be traced to the same source. In consequence of some local irritation or of some condition of weakness of the tissues the connective tissue corpuscles were said to undergo proliferation and lead to the development of a primary cancer. After this had developed, the cancer cells, which were "carriers and producers" of the specific virus, acted as infecting agents to spread the disease to the immediate vicinity, the adjacent lymphatic glands, and remote organs.

Supported by the clinical and microscopical investigations of Foerster, C. O. Weber, Paget, Billroth, etc., the theory of the connective tissue origin of cancer soon became the dominant one.

Not until Thiersch, after reporting upon 102 well observed cases of epithelial cancer of the external skin, brought proof that the tumor developed from the direct proliferation of the epithelial elements, was investigation directed to all sides of the question.

This theory was sustained by the following fundamental views which were regarded as incontrovertible. Since the time of J. Mueller it had been assumed "that the finest elements of carcinoma tissue were not essentially different from the tissue elements of benign tumors and the primitive tissue of the embryo" and also that the formations of one germinal layer did not permit a transition into those of another. It was also known that in certain forms of typical proliferation (adenomata, warts, etc.) the interpapillary rete and also the epithelioidal elements of the cutaneous glands increase without any notable implication on the part of the connective tissue. It was therefore taken for granted that an epithelioidal proliferation could take place under pathological conditions to the exclusion or with the implication of the other tissue elements. If this is so, there is no objection to the view that epithelial cancer develops only from pre-existing epithelium. With regard to the occurrence of primary cancer in organs which possess no epithelium,

Thiersch believes that this is sufficiently explained by the aberrant occurrence and subsequent proliferation of epithelium in such places.

Waldeyer arrived at the conclusion, in opposition to Thiersch, that there are not different forms of cancer, but that cancroid, epithelioma, alveolar carcinoma, etc., are identical, that carcinoma is only derived from pre-existing epithelium. He had not observed a single authentic case of primary carcinoma of the lymphatic glands, bones, spleen, vessels, in short of such organs in whose structures derivatives of both epithelial germinal layers do not enter.

But the majority of authors have adhered either to the view of the connective tissue origin of cancer or believe that it may be derived both from the former and from epithelium.

Two years after the appearance of Waldeyer's work, Koester endeavored to show that carcinoma is the result of endothelial proliferation of the lymphatic vessels and that the connective tissue only contributes to the proliferation during the later stages. He was led to form this opinion for the reason that the dichotomous ramifications of the cancer bodies often reproduce the appearance of the lymphatic network situated in the cutis, that the alveolar spaces of cancer look like the results of an epithelial proliferation in the lymph spaces, that the original endothelium is absent in the lymphatics which are in contact with the cancer, and finally that there are transitional forms between the endothelium and the cancer cells.

Koester's views have received few adherents, although some writers believe that the endothelium, on account of its close relations to the connective tissue type from an embryological standpoint, may be regarded as a special source of carcinoma.

In a truly classical work published by Waldeyer in 1872, this writer endeavors to show that modern embryological conceptions oppose the view that neoplasms of similar structure in one and the same organ should take their origin at one time from this, at another time from that tissue element, while experience shows that the original kind of epithelium is retained. He also attempted to prove that the epithelium cells possess the same power of proliferation by endogenous cell division, fission, etc., as the connective tissue corpuscles. Furthermore among the two hundred tumors examined by him the epithelium-like groups of cells were always connected with pre-existing epithelium, nor did he ever find any transitions between the wandering cells or other forms of cells and epithelium. He also states that, with the exception of one doubtful case, he has observed no primary carcinoma of a non-epithelial organ, and believes that Thiersch's hypothesis of aberrant epithelial germs will explain the few authentic cases of this character.

Let us consider somewhat critically the grounds for the theory of the exclusively epithelial genesis of carcinoma.

The arguments in favor of this view are both positive and negative. The former prove that proliferations of epithelium are capable of producing neoplasms; this is acceded by most pathologists and clinicians.

The case is different with that portion of the argument which denies the immediate implication of the tissue of the middle germinal layer in the production of cancer, inasmuch as an entire series of appearances testify that the epithelioidal cells of carcinoma also take their origin from fixed connective tissue corpuscles, endothelium, muscle cells, etc.

The borders of thin sections of cancer undoubtedly show "a sharp boundary between the epithelial foci and the surrounding granulation cells," but the profusely proliferating